

National Data Warehouse Project: Executive Summary

Overview

The National Data Warehouse (NDW) project will upgrade the Indian Health Service's (IHS) national data repository, the National Patient Information Reporting System (NPIRS), to a new, state-of-the-art, enterprise-wide data warehouse environment. NPIRS is a designated organizational unit within the Office of Information Technology, Indian Health Service, located in Albuquerque, New Mexico and has been in existence since 1986. The purpose of NPIRS has always been to produce various reports that are required by statute and regulation and provide a broad range of clinical and administrative information to managers at all levels of the Indian health system to allow them to better manage individual patients, local facilities, regional and national programs. The Indian Health Performance Evaluation System (IHPES), a Phoenix Area IHS program, is collaborating with DIR on the NDW project. IHPES is a Joint Commission on Accreditation of Healthcare Organizations (JCAHO) listed performance measurement system that began in 1998. IHPES enables 42 IHS and tribal facilities nation-wide to comply with JCAHO requirements for accreditation, accreditation that is required for Medicare and Medicaid, as well as certain other types of billing. In recent years, IHPES has assisted other programs in a number of different developmental type data projects. Together, DIR and IHPES are upgrading the NPIRS system to a NDW design that incorporates both their systems, one that will provide more accurate, timely, and a broader scope of information than was previously available to clinical and administrative managers throughout the Indian health system.

The data in the NDW comes from government and commercial healthcare information systems that are largely transaction-based systems utilized at the local level to support the provision of patient care, as well as from other specified sources (e.g. IHS Fiscal Intermediary, Social Security Administration). The data includes demographic data; third-party eligibility information; patient-based clinical data (e.g., health factors); and encounter-based clinical data (e.g., purpose of visit, procedures, medications, laboratory test results, radiological results). Historical records of changes in these data are maintained so information about past as well as current circumstances can be obtained.

Information will be retrieved from the NDW via reports and ad hoc database searches. Internal users and selected authorized external users of the NDW will have access to more structured and specific subsets of this information (data marts), appropriate to their approved need and access. Because these data marts need not be permanent and their entire data can be refreshed, if required, from the permanent record contained in the data warehouse database, they can be highly user-definable and adaptable, containing, for example, transformed or aggregated data, that may be deleted, modified, or replaced. Because of their relatively smaller size and their simpler structure, search efficiency will be optimized, and data can be readily available to authorized users.

Customer Benefits

When complete, the NDW will:

- Provide the capability to produce reliable and timely reports and data sets to support IHS statutory, regulatory and administrative obligations, including user population counts, workload reporting, accreditation, and GPRA performance measurements.
- Improve the quality, timeliness and frequency of verified and published IHS data related to patient registration and health care encounters.
- Provide user accessibility to a comprehensive IHS healthcare database that will enable analysis and reporting of:
 - Clinical practice patterns and episodes of care (diagnosis, treatment, wellness, prevention and screening services)
 - Measures of quality of care, clinical outcomes, disease management, prevention

- Population-based epidemiological studies of disease states, medical histories, health behaviors, risk factors, and clinical outcomes
- Specialized healthcare programs including diabetes, dental, public health nursing, alcohol & substance abuse
- Patient demographics and healthcare utilization patterns
- Data from which health care costs can be estimated for budget and resource planning
- Utilization of alternative resources
- Provide relevant information (metadata) about the data it contains to enable end users to effectively leverage data resources for management decision-making and clinical research.
- Facilitate the standardization of export programs, source data files formats and code values wherever possible, to maximize data processing efficiency and data quality.
- Provide user accessibility through web-based technologies and end-user desktop applications.
- Protect community, tribal and facility confidentiality in accordance with negotiated agreements and understandings with IHS/Tribal/Urban (I/T/U) organizations.
- Protect individual privacy and security of health care data, in compliance with applicable privacy regulations and IHS policies.
- Provide feedback to suppliers of data regarding detection of critical and non-critical errors affecting data quality and completeness.
- Restore stakeholder confidence in IHS centralized data sources and increase user self-sufficiency in accessing and using IHS data.

NDW1 Scope Summary

The scope for the first iteration of the data warehouse (NDW1) includes:

- Accept all the encounter- and registration-record-based data elements (with a few additions) included in the most recent RPMS export to NPIRS and IHPES
- Create a highly normalized information model that accommodates all of these elements (so that it will be able to accept all entries in a multiple field such as diagnoses, immunizations, ADA codes, etc. rather than just an arbitrary, limited number such as “the first 3”)
- Implement the unique IDs for both registration and encounter records so that they can be accurately linked.
- Implement a unified registration and encounter record export so that we minimize the chance the NDW will receive an encounter record without a registration record with which to link it
- Maintain historical snapshots of the state of registration and encounter records so that we can reproduce reports based on data in existence at some set point in the past
- Utilize the stated IHS Architecture for the RPMS export (and wherever possible, the non-RPMS exports) to the NDW including:
 - Utilize the industry standard HL7 format (so that sites using non-RPMS systems can more easily send us their data, too)
 - Utilize an Interface Engine to route and reformat these exports
- Implement appropriate security and privacy controls as required by HIPAA and Privacy Act regulations
- Provide significantly enhanced export tracking information to local exporting facilities and Areas so that they can make sure we got all the data they sent.
- Provide better tools to assure data integrity and report errors so that sites can be assured that we have not altered any of the data they sent.
- Produce all current and essential Agency reports including
 - Workload and User Population reports
 - JCAHO ORYX reports
- Provide easy to use, readily available, search efficient access for authorized users to appropriately configured clinical and administrative data, including standard reports and ad hoc access, using both

web-based technologies and end-user desktop applications, appropriate user-specific access controls, etc.

- Pilot tools for assessing site-specific data quality, e.g., assessing field content, variations in historical norms in the numbers of records received, currency of data (so that we can answer questions such as how far back does one have to go to be assured we have “all” of a site’s encounter data; i.e. what is the data entry/export lag at a given site/Area/nationally).
- Design the system so that it can best accommodate future, as of yet unanticipated needs

Specifically excluded from the scope of DW1 are:

- Data elements not on the list provided on the NDW web page at <http://www.ndw.ihs.gov/>. The following are examples of data elements not included in DW1:
 - All lab tests performed (only a limited subset will be exported to DW1)
 - Information associated with each Medication record other than what is specified, such as dosage strength and frequency, NLM’s clinical drug code (currently being developed)
 - All clinical measurements (only heights, weights, and blood pressures are being exported in DW1)
- Certain registration-record-based clinical information such as: problem list diagnoses or conditions; history of surgery or procedures; allergies or adverse reactions; last occurrence of various measurements, immunizations, exams, etc. (unless any of the above are captured in an encounter record that falls within the range of the initial back load and subsequent exports).
- A definitive method to unduplicate records of the same encounter that are received from multiple source systems (e.g., PCC versus the IHS Fiscal Intermediary)
- Employee information
- Equipment information
- Billing information (costs, fees, billed amounts, paid amounts, etc.) - other than certain specified third party eligibility information
- Cost accounting (specific costs for provided services) - other than estimates that can be derived from information already collected in DW1
- Data from outside sources such as Vital Statistics, Census, Medicare and Medicaid (although pilot efforts are planned in DW1 to begin to look at some of these)
- A national level operational data store (ODS). This is another important type of national repository that complements, but is distinct from a data warehouse structure. In an ODS stored data is more volatile and real-time. An ODS stores the most current data rather than historical snapshots, and is more focused on ongoing, up-to-the-minute individual care, billing, and so forth rather than retrospective analyses.
- A national level master person index (MPI). Although NDW1 will include functional components that usually are included in an MPI (e.g., probabilistic matching that unduplicates registration records to best approximate true “person” counts), it will not include key MPI functionality such as support for real-time queries and updates, rigorous manual review of possible matches, etc.

However, many of the items denoted above as excluded from NDW1 will be considered for future iterations of the NDW and/or separate but related national level projects, dependent on their user-determined priority and available resources.

Additional Information

Additional information about the NDW project can be found on the NDW web page at: <http://www.ndw.ihs.gov/>